

### **REMARKS**

Claims 1, 2, 5, 6 and 8-13 are pending in the present application. Claims 1, 2, 5 and 6 are herein amended. No new matter has been presented.

Support for the amendment to the claims is in the specification at, *e.g.*, page 12.

### **Claim Rejections – 35 U.S.C. § 103**

#### **A. Rejection based on Kallenbach in view of Akihoshi**

Claims 1, 2, 8, 9 and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kallenbach (US 5,212,214) in view of Akihoshi (US 4,642,161). Favorable reconsideration is requested.

Applicants respectfully submit that Kallenbach in view of Akihoshi does not teach or suggest:

a shaped aluminum alloy material that has been subjected to a dipping process in which it is dipped in a 3 to 10% hydrazine monohydrate aqueous solution at 40 to 70°C, said shaped aluminum alloy material having fine recesses with a diameter of 30 to 300 nm on the surface of said shaped aluminum alloy material, said fine recesses having been formed by a basic reaction

as recited in amended claim 1 and similarly recited in amended claim 2. The claimed hydrazine solution reacts with an aluminum surface in a basic reaction. It is not a reduction reaction.

The Office Action acknowledged that Kallenbach does not disclose the recited dipping process. (Office Action, page 2.) The Office Action cited Akihoshi for teaching this process.

Akahoshi discloses a method of bonding copper and a resin together with consistently high bonding strength and acid resistance. Akahoshi discloses removing the oxide layer formed

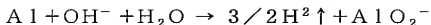
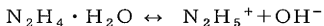
on the surface of copper by using a reducing agent, by a general formula:  $\text{BH}_3 \cdot \text{NHRR}'$ , and including dimethylamine borane and ammonia borane. (Col. 4, lines 12-20.)

However, the reducing agent in Akahoshi does not correspond with a 3 to 10 % hydrazine ( $\text{N}_2\text{H}_4$ ) monohydrate aqueous solution ( $\text{N}_2\text{H}_4 \cdot \text{H}_2\text{O}$ ) as recited in the present claims.

Akahoshi discloses that with hydrazine, the oxide layer is hardly reduced to metallic copper, and that hydrazine did not attain metallization of the oxide layer even when the concentration, the PH value, or the treatment temperature was changed. (Col. 3, line 57 to col. 4, line 11.) Akahoshi further discloses that it is impossible to reduce the copper oxide to metallic copper with hydrazine. (Col. 5, lines 19-29.) Akahoshi solved this problem by using amine boranes as a reducing agent. (Col. 5, lines 29-34.)

Reduction of copper oxide is much easier than reduction of aluminum oxide. Although copper oxide is a representative metal which can be reduced easily, it is impossible to reduce copper oxide with hydrazine under usual conditions. Thus, one of ordinary skill in the art would recognize that aluminum oxide cannot be reduced with hydrazine under usual conditions.

The reaction caused by dipping aluminum alloy material in a 3 to 10% hydrazine monohydrate aqueous solution at 40 to 70°C is a basic reaction as recited in the claims and as shown below by the following reaction formula.



The Office Action stated that aluminum will easily form an inherent oxide layer when exposed to air. (Office Action, page 5.) However, the inherent oxide layer of aluminum is very thin (1-3 nm thickness) and easily broken by being dipped in acid solutions or alkaline solutions. From the point of view of common general technical knowledge, one of ordinary skill in the art would understand that the above reaction would occur immediately or after induction period by the oxide layer has been broken briefly.

**B. Rejection based on Haak in view of Akihoshi**

Claims 1, 2, 5, 6 and 8-13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Haak (US 2001/0036559) in view of Akihoshi (US 4,642,161). Favorable reconsideration is requested.

Applicants respectfully submit that Haack in view of Akihoshi does not teach or suggest:

a shaped aluminum alloy material that has been subjected to a dipping process in which it is dipped in a 3 to 10% hydrazine monohydrate aqueous solution at 40 to 70°C, said shaped aluminum alloy material having fine recesses with a diameter of 30 to 300 nm on the surface of said shaped aluminum alloy material, said fine recesses having been formed by a basic reaction

as recited in amended claim 1 and similarly recited in amended claim 2, and the similar method step as recited in amended claims 5 and 6.

The Office Action acknowledged that Haak does not disclose the treatment of a shaped aluminum alloy material as recited in the claims. (Office Action, page 3.) The Office Action cited Akihoshi for teaching that the treatment would have been obvious.

Amendment under 37 C.F.R. §1.116  
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For the reasons stated above, Applicants respectfully submit that Akihoshi does not teach the treatment as recited in the claims. Neither Haack nor Akihoshi discloses the treatment process and the resulting structure of the shaped aluminum alloy material as recited in the present claims, and thus, the present claims are non-obvious over Haack in view of Akihoshi.

For at least the foregoing reasons, claims 1, 2, 5, 6 and 8-13 are patentable over the cited references. Accordingly, withdrawal of the rejections of claims 1, 2, 5, 6 and 8-13 is hereby solicited.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

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If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,  
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